

REMARKS

Claims 1-9 are pending in this application. By this Amendment, claims 1 and 9 are amended. No new matter is added.

Reconsideration in view of the above amendments and the following remarks is respectfully requested.

The Office Action rejects claims 1-5, 8, and 9 under 35 U.S.C. §103(a) as being unpatentable over Ota et al. (U.S. Patent No. 6,040,886) in view of Lu (U.S. Patent No. 6,426,786 B1); rejects claim 6 under 35 U.S.C. §103(a) over Ota in view of Baek et al. (U.S. Patent No. 6,657,689); and rejects claim 7 under 35 U.S.C. §103(a) as being unpatentable over Ota in view of Hayashi (U.S. Patent No. 6,540,361). These rejections are respectfully traversed.

At the outset, Applicants note that the Office Action appears to contain several discrepancies. Specifically, for the rejection of claim 6, the Office Action refers to the Lu reference when Baek reference is discussed in the substance of the rejection. Also, for the rejection of claim 7, reference is made to the Kim et al. reference when it appears that the Ota reference should have been cited. Hereinafter, the Remarks will refer to the references that the Applicants believe that the Examiner intended to refer to.

The Office Action asserts that it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the LCD system of Ota et al. and the nematic liquid crystal mixture having a negative dielectric anisotropy wherein the liquid crystal exhibits homeotropic alignment of Lu et al. (col. 7, lines 19-21) since one would be motivated to provide precise alignment of the liquid crystals.

However, Applicants respectfully assert that the aforementioned combination of Ota et al. and Lu et al. would result in an invention that is inoperable for its intended purpose.

Referring to Ota et al., the liquid crystal molecules exhibiting homogeneous alignment within the liquid crystal composition material having a positive dielectric anisotropy (col. 4, lines 33-46) are controlled mainly by the electric field E applied in the horizontal direction (col. 6, lines 65-67, as well as figs. 1(b), 7(b)-9(b), 11(b)-15(b), and 20(a)-20(d)).

In the absence of an electric field, the liquid crystal molecules are aligned substantially parallel to the surface of the substrates due to their homogeneous initial alignment (fig. 20(a)). When the electric field is applied, the liquid crystal molecules, due to their positive dielectric anisotropy, change their orientation to align the major axis with the direction of the electric field (col. 4, lines 47-50, and fig. 20(b)). Because the liquid crystal has a positive dielectric anisotropy and a homogeneous initial alignment, a switching movement, between the orientation of liquid crystal molecules in fig. 20(a) and 20(b), can be generated by turning the lateral electric field ON and OFF.

However, no such switching movement would be generated if the liquid crystal used in the LCD system of Ota et al. had a negative dielectric anisotropy exhibiting homeotropic alignment in the initial alignment state. That is, the liquid crystal molecules that exhibit homeotropic alignment in the initial alignment state have a substantially vertical alignment with respect to the substrate in the absence of an electric field. In addition, when a liquid crystal has negative dielectric anisotropy, the minor axis of the molecules tends to align with the direction of the electric field. When an electric field is applied in the horizontal direction, the liquid crystal molecules having negative dielectric anisotropy exhibiting homeotropic alignment in the initial alignment state will show substantially no change in alignment because the minor axis of the molecules would have already been aligned with the direction of the lateral electric field. Consequently, since no switching movement is possible, the system is inoperable.

Therefore, Applicants respectfully submit that it would not have been obvious to one of ordinary skill in the art to combine or modify the aforementioned references at the time the invention was made.

In accordance with the above remarks, Applicants submit that claims 1-9 define patentable subject matter.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-9 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Bogdan A. Zinchenko
Registration No. 57,473

JAO:BAZ/amw

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OLIFF & BERRIDGE, PLC
P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

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